1000 River Street
Essex Junction, VT 05452

February 24th, 2011

Ms. Lynn Metcalf
Waste Management Division
Vermont Agency of Natural Resources
103 South Main Street, West Building
Waterbury, VT 05671-0404

Ms. Metcalf:

Attached is the 2010 Annual Report of International Shipments of Hazardous Waste for the IBM Corporation facility in Essex Junction, Vermont (EPA I.D. Number VTD002084705). Also included with this report is an update of the waste minimization activities at IBM. The waste minimization update includes a summary of chemical review procedures, a description of 2010 waste minimization efforts, and activity planned for 2011. This information has also been sent to the USEPA as required by Section 7-708(c) of the Vermont Hazardous Waste Management Regulations and 40 CFR 262.56(a) of the Federal regulations.

Please contact Candice Callahan by telephone at (802) 769-0579 or electronically at *ccallaha@us.ibm.com* with any questions or for further information.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Sincerely,

Janette Bombardier

Janette Bombardier
Director, IBM Vermont Site Operations & Senior Location Executive

cc: Office of Enforcement and Compliance Assurance
Office of Federal Activities
International Compliance Assurance Division (2254A)
Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460

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sex Junction, VT 05452

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Department:

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Office of Enforcement and Compli
Office of Federal Activities
International Compliance Assuran
(2254A)
Environmental Protection Agency
1200 Pennsylvania Avenue, N
Washington, DC 20460

RETURN RECEIPT
REQUESTED

Annual Report of International Shipments of Hazardous Waste
2010 Calendar Year

Exporter:	IBM Corporation
EPA I.D. Number:	VTD002084705
Site & Mailing Address:	1000 River Street Essex Junction, VT 05452
Contact:	Candice Callahan
Calendar Year:	2010

Consignee 1:

Consignee Name	Consignee Site Address	Consignee EPA I.D. Number
Stablex Canada, Inc.	760 Boulevard Industrial Blainville, Quebec J7C 3V4 Canada	NYD980756415

Wastes Exported:

Description of Hazardous Waste Exported	EPA Hazardous Waste Number	DOT Hazard Class	Transporter(s)	Transporter(s) EPA I.D. Number	Total Waste Shipped (pounds)	Total Shipments	EPA Notice Number
a. Filter Cake	F006	9	Transport Rollex LTEE	NYF006000053	4,723,006	117	014/10

Consignee 2:

Consignee Name	Consignee Site Address	Consignee EPA I.D. Number
Chemrec, Inc.	190 Brosseau Cowansville, Quebec J2K 3G6 Canada	NC0000000344

Wastes Exported:

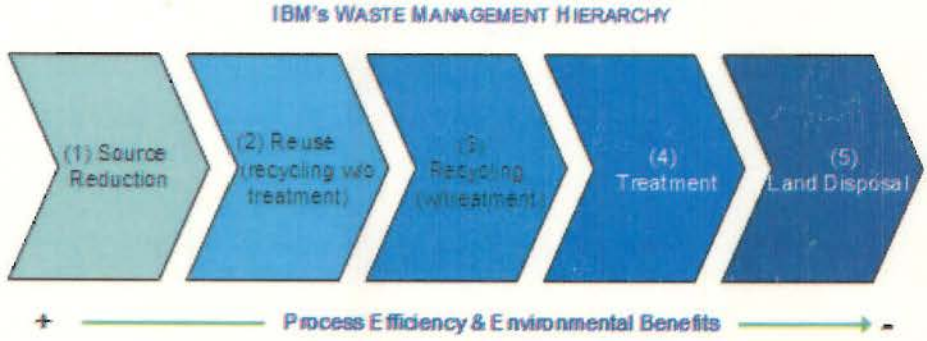
Description of Hazardous Waste Exported	EPA Hazardous Waste Number	DOT Hazard Class	Transporter(s)	Transporter(s) EPA I.D. Number	Total Waste Shipped (pounds)	Total Shipments	EPA Notice Number
a. Waste Organic Solvents for Recycling	D001	3	Freehold Cartage, Inc.	NJD054126164	171,420	4	574/09
b. Waste Organic Solvents for Recycling	D001, D023-D026	3	Freehold Cartage, Inc.	NJD054126164	470,550	11	574/09

WASTE MINIMIZATION UPDATE

February 24th, 2011

WASTE MINIMIZATION PROGRAMS AND PROCESSES

The IBM Corporation uses the following hierarchy in implementing waste minimization techniques:



IBM Burlington has focused on achieving waste minimization through the implementation and effective management of the following programs and processes, which directly or indirectly aid in minimizing the generation of hazardous waste. These programs and processes are continuously being refined to enhance the site's waste minimization efforts.

- Chemical Authorization Process
  - All chemicals that are new to the site or existing chemicals with a new use are reviewed for environmental and safety impacts. Less toxic substitutes are required when available.
- Process Environmental Impact Assessment
  - All new chemical using manufacturing and facilities equipment are reviewed to identify potential significant impacts to the environment from IBM processes; to consider feasible alternatives for avoiding potential impacts; and to ensure compliance with applicable legal and regulatory requirements.
- Waste Disposal Characterization
  - The site has a waste disposal process that allows containerized chemical waste to be tracked from the point of generation to the point of disposal. Based on the waste characteristics, the proper disposal method is established, including reuse and recycling when feasible.
- Toxics Use and Hazardous Waste Reduction Planning
  - IBM also has a plan identifying source reduction and waste minimization opportunities for all SARA 313 chemicals and hazardous waste streams that fall under the planning requirements, per the requirements of Vermont's ACT 100. Waste minimization efforts are reported to the State of Vermont in the annual Pollution Prevention Progress Report.
- Product Environmental Impact Assessment
  - In addition to its processes, IBM must also ensure that its products do not have a detrimental effect on the environment and that all products are introduced in compliance with Federal, State, community and IBM Corporate rules and regulations. A Product Environmental Profile is prepared to predict and minimize or eliminate adverse environmental effects of IBM products, both within the manufacturing facility and at the customer location.

2010 WASTE MINIMIZATION RESULTS

Using 2005 as a baseline, the amount of production hazardous waste generated in 2010 was reduced by approximately 49.3% from 2005 (when indexed to production).

RESTRICTION OF HAZARDOUS SUBSTANCES (ROHS)

IBM continued its efforts in 2010 on qualification and introduction of lead-free and lead reduced technologies. IBM worked with our internal and external customers to develop a strategy to phase out lead containing products as the EU ROHS exemptions for the current lead uses expire.

REGISTRATION, EVALUATION, AUTHORIZATION AND RESTRICTION OF CHEMICAL SUBSTANCES (REACH)

IBM Microelectronics Division (MD) also continued our assessment of the newly proposed REACH Substances of Very High Concern (SVHC) list with regards to impact on MD products/packaging. As part of this assessment, IBM requested substance information from our suppliers to determine if any of the substances on the SVHC list were present in the products and packaging being supplied to IBM. On June 18, 2010, and December 15, 2010 the European Chemicals Agency formally published the third, and fourth candidate lists of SVHC. IBM confirmed that none of the substances published in the third and fourth SVHC lists are present above the applicable threshold in MD's products/packaging.

SOLVENT AND PHOTORESIST USAGE REDUCTION PROJECTS IN WAFER MANUFACTURING OPERATIONS

Solvent Block Process Savings in 2010:

In 2009 a new process was qualified on the photoresist tracks which allowed the periodic dispense of solvents, top anti-reflective coatings (ARCs), bottom ARCs, and photoresists on these tools to be reduced from once every 30 minutes to once per shift. This greatly reduces the photoresist, ARC and solvent waste. This process was fully implemented on the 193 nm TEL tracks in 2009. The process was implemented on additional DUV tracks in 2010. This resulted in a total savings of 564 liters of photochemical waste in 2010

Optimizing Photochemical Usage by Increased Monitoring:

Photochemical waste returned as partial or full NowpaksTM was tracked and evaluated to determine why the chemical was not fully utilized. Chemical usage trends were also tracked by toolset to identify any areas for improvement. Total reduction of 506 liters of photochemical waste occurred in 2010 as a result of this increased monitoring of photochemical usage.

SILICON RECLAIM

The IBM Burlington (BTV) semiconductor manufacturing facility continued to utilize silicon wafer recycling processes developed in 2008. Once the wafers reach end of life they are shipped to Endicott, NY for preparation and sale to the solar cell industry.

The wafer recycling process included the following silicon scrap waste streams:

- non-leaded wafers;
- non-leaded wafer pieces;
- non-leaded wafer shards;
- leaded wafers;
- monitor wafers.

The overall silicon sent from IBM Burlington for recycling in the solar panel industry in 2010, instead of being sent to landfill, was 5,226 pounds.

RECOVERY OF FOMBLIN OILS USED IN PRECISION VACUUM PUMPS

Segregation of waste perfluorinated oil and equipment filters allows the perfluorinated oil to be recovered and returned to the site for reuse. The exemption to ship waste Fomblin oil for recycle/reuse was obtained in April 1994. In 2010, 5, 344 pounds of used Fomblin oil were sent for reclaim instead of disposal.

ON-SITE TREATMENT OF WASTE AT WASTEWATER TREATMENT PLANT

The IBM Burlington manufacturing facility owns and operates a state-of-the-art, NPDES permitted on-site wastewater treatment plant. This wastewater treatment plant consists of four main wastewater treatment processes: Concentrated Wastewater Treatment, Biological Wastewater Treatment, Chemical Mechanical Polish Wastewater Treatment, and Industrial Wastewater Treatment. Utilizing the capabilities of these treatment processes allowed IBM to treat approximately 2,835,750 pounds of waste on-site in lieu of sending it off-site for treatment. On-site treatment dramatically reduces the number of waste shipments required, reducing the need for transportation of those wastes.

Table 1 below outlines the types and estimated quantities of waste treated in 2010:

Waste Stream Name	*Portion of Treatment Facility Where Treatment Occurred*	*Total Treated (estimated pounds)*	*Percent of Waste Generated*
Copper Sulfate Solution	Chemical Mechanical Polish (CMP) Wastewater Treatment Plant	129,000	100
Deep Ultraviolet (DUV) Waste	Biological Wastewater Treatment Plant (BWTP)	254,000	57
Ethylene Glycol Solutions	Biological Wastewater Treatment Plant (BWTP)	23,000	100
HF-Ethylene Glycol (HF/EG)	Biological Wastewater	111,000	100

Waste Stream Name	*Portion of Treatment Facility Where Treatment Occurred*	*Total Treated (estimated pounds)*	*Percent of Waste Generated*
	Treatment Plant (BWTP)		
Isopropanol (IPA)	Biological Wastewater Treatment Plant (BWTP)	382,000	97
Miscellaneous Containerized Waste	Chemical Mechanical Polish (CMP) Wastewater Treatment Plant	63,900	100
Miscellaneous Containerized Waste	Concentrated Wastewater (CW) Treatment Plant	13,500	100
Miscellaneous Containerized Waste	Industrial Wastewater Treatment Plant (IWTP)	1,350	100
Wastewater Tank Liquid Sludge	Industrial Wastewater Treatment Plant (IWTP)	1,858,000	100
	TOTAL =	**2,835,750**	

Table 1

DECONTAMINATION FACILITY OPERATIONS

The IBM Burlington facility operates a decontamination facility on site. This facility handles the sorting of contaminated as well as non-contaminated trash. The facility processes corrosive and solvent contaminated trash, scrap metal, plastic, and other materials. Contaminated items are cleaned and decontaminated, where applicable, and sorted into the appropriate waste streams. The decontamination facility also segregates metals, high density plastics, computer boards and modules, wood, silicon parts, and other recyclables into the appropriate recycle streams. In addition, the facility has two bottle wash stations for cleaning empty chemical containers and a cleaning process for chemical Nowpak ™ containers.

Decontaminated items leave the facility as recyclable glass, plastic, or metal, or general trash instead of chemical or hazardous waste. In 2010, over 377,400 pounds of waste was decontaminated at this facility.

Table 2 below outlines the types and estimated quantities of waste decontaminated in 2010:

Waste Stream Name	*Total Decontaminated (estimated pounds)*
Glass and Plastic Chemical & Nowpak ™ Bottles for Recycle	37,900
Other Plastics for Recycle	25,500
Corrosive Contaminated Trash	53,600
Other Non-Recyclable Trash	600
Metal Reclaim	254,000
High Density Plastics	5,800
TOTAL =	**377,400**

Table 2

DUV AND MID-ULTRAVIOLET (MUV) WASTE STREAMS FOR RECLAMATION

The main constituent in both the DUV and MUV waste streams is Propylene Glycol Monomethyl Ether Acetate (PGMEA). In 2010, all the DUV and MUV waste shipped off site was sent for reclaim, a total of 641,970 pounds. The reclaimed PGMEA is used by other companies that can utilize the material at the purity level achieved by reclamation.

N- METHYL-2-PYRROLIDONE (NMP) WASTE RECLAMATION

Drummed NMP

This waste is generated by the polyimide apply tools in manufacturing. It consists primarily of NMP. The polyimide TEL tracks use technology that helps prevent hazardous waste polyimide from entering the waste stream. Due to this technology, the waste stream is primarily NMP and can be classified as non-hazardous.

This waste stream is sent off site for reclamation. The amount of drummed NMP waste sent for reclamation in 2010 was 42,455 pounds.

Bulk NMP

This waste stream is sent off site for reclamation. The amount of bulk NMP waste sent for reclamation in 2010 was 46,880 pounds.

POLYIMIDE PROCESS OPTMIZATION

In 2010, the Polyimide shot size for HD4004 chemical was reduced by approximately 1/3. This resulted in 20 liters of usage reduction for the HD2004 chemical in the Polyimide apply process.

GLASS MASK RECLAIM

Masks are manufactured in the IBM Burlington mask house and consist of quartz plates covered on one side with a chromium oxynitride film. Phase shift masks also have a molybdenum silicide layer. Most used or defective masks have a market value and are shipped to a vendor where they are stripped to bare quartz. Once stripped of their images the glass is purchased by the reclaim vendor for reuse. In 2010, 11,579 pounds of glass masks were sent for reclaim instead of being sent off-site for disposal.

INDUSTRIAL WASTEWATER TREATMENT PLANT OPTIMIZATION

In 2010, the Industrial Wastewater Treatment Plant (IWTP) continued to shutdown 2 process clarifiers, when not needed (only needed an estimated 5-10% of the time), to save on the amount of sulfuric acid, lime, energy, and polymer used in the overall treatment process. The shutdown of these clarifiers also reduced the amount of IWTP sludge required for disposal. This is also a significant energy reduction. The overall treatment efficiency of the IWTP was maintained with the reduced use of these additional clarifiers. This was accomplished through the use of a new polymer in the treatment process and the implementation of a system of process controls to enhance clarifier performance. These process changes have resulted in significant cost savings as well. Combined annual savings from the improvements is at least $150,000.

The IWTP focused on continued chemical use reductions in 2010. Chemical usage was reduced through the following process optimizations:

- Shutdown of 2 treatment clarifiers,
- Running a higher pH in the equalization basin,
- Running a higher clarifier recycle pH,
- Running a slightly higher outfall pH,
- Developing a system that completely emptied polymer totes,
- Running defoamer only when needed (as opposed to running it all of the time),
- Sodium bisulfite usage reduction based on analytical outfall data,
- A new sodium bisulfite dose location which allows more reaction time and requires less usage

INDUSTRIAL WASTEWATER TREATMENT PLANT (IWTP) SLUDGE

Although the IWTP sludge falls under the F006 RCRA definition, it meets none of the original listing criteria for F006. Since the sludge is a functionally non-hazardous waste stream, IBM Burlington is working with EPA Region 1 to pursue a federal delisting of this waste.

In 2010, IBM worked with EPA Region 1 to develop a Quality Assurance Project Plan (QAPP). The QAPP outlines all required sampling and analysis for the delisting process. The QAPP was approved and signed by EPA Region 1 on 01/27/11. Sampling began the first week of February. EPA Region 1 also provided a project schedule for the entire delisting project with a target closure date of March 2012.

The delisting of this sludge may allow for the material to be recycled, in lieu of sending the material to landfill.

WASTE MINIMIZATION PLANS FOR 2011

Actively work through the year in evaluating and implementing economically and technically feasible waste reduction and toxic reduction opportunities on focus chemicals identified in the pollution prevention and waste minimization plans.

SOLVENT AND RESIST DISPENSE VOLUME REDUCTIONS IN PHOTOLITHOGRAPHY OPERATIONS

Solvent Block Process in 2011:
In 2009 a new process was qualified on the photoresist tracks which allows the periodic dispense of solvents, top anti-reflective coatings (ARCs), bottom ARCs, and photoresists on these tools to be reduced from once every 30 minutes to once per shift. This greatly reduces the photoresist, ARC and solvent waste. This process was fully implemented on the 193 nm TEL tracks in 2009 on some of the Deep Ultraviolet (DUV) tracks during 2009 and 2010. The process will be implemented on three last remaining DUV tools in 2010.

Bulk Gamma-Butyrolactone/N-Butyl Acetate (GBL/NBA) Solvent:
Plan to convert four TEL tracks to bulk GBL/NBA solvent instead of the use of individual ten liter Nowpaks™. This project will optimize the use of the GBL/NBA solvent by switching to bulk delivery and help reduce the waste generated from disposing of empty Nowpaks™.

Resist and Anti-Reflective Coating (ARC) Consolidations:
Consolidation of certain photochemicals will be evaluated in 2011. This has the potential to optimize and reduce the overall photochemical usage.

Optimizing Photochemical Usage by Increased Monitoring:
Photochemical waste returned as partial or full Nowpaks™ will be tracked and evaluated to determine why the chemical was not fully utilized. Chemical usage trends will also be tracked by toolset to identify any areas for improvement. This is an ongoing activity from 2010.

POLYIMIDE PROCESS OPTIMIZATION

Evaluate consolidation of polyimide/photo sensitive polyimide (PSPI) products into one chemical. This would result in chemical cost savings, would reduce process steps, and would eliminate the need for several other chemicals.

ETHYLENE GLYCOL USE IN CHILLERS

A 50/50 ethylene glycol and water mixture is used as a tool maintenance chemical on a large number of semiconductor manufacturing tools in the facility. For the long term, continue to evaluate switching to an alternate chemistry and solid state chillers that would completely eliminate the use of ethylene glycol in this application.

INDUSTRIAL WASTEWATER TREATMENT PLANT OPTIMIZATION

In 2011, the IWTP plans to focus on the following projects:

- Polymer usage reduction through process optimization;
- Lime use reduction work to reduce the amount of lime used in the gravity thickener.

INDUSTRIAL WASTEWATER TREATMENT PLANT (IWTP) SLUDGE

IBM Burlington will continue to work with EPA Region 1 in 2011 and 2012 to pursue a federal delisting of this waste.

2011/2012 Goals Include:

- Complete sampling and analysis identified in the approved Quality Assurance Project Plan (QAPP);
- Submit report/analytical data to EPA Region 1;
- EPA Region 1 to run delisting model and report results back to IBM;
- Follow established delisting decision, public review, comment, and approval process.

ON-SITE TREATMENT OF SOLVENT, COPPER SULFATE, AND MISCELLANEOUS CONTAINERIZED WASTE STREAMS

Biotreatment of DUV waste, IPA, HF/ethylene glycol, and ethylene/propylene glycol will continue in 2011, including continued efforts to determine the maximum practical loading for these waste streams in the BWTP.

Copper sulfate treatment through the Chemical Mechanical Polishing (CMP) portion of the Industrial Wastewater Treatment Plant (IWTP) will also continue in 2011 with a goal to treat 100% of the amount of this waste generated in 2011.

Miscellaneous containerized waste treatment through portions of the Industrial Wastewater Treatment Plant (IWTP) will also continue in 2011 as allowed.

DECONTAMINATION FACILITY OPERATIONS

The decontamination facility will continue to process corrosive and solvent contaminated trash, scrap metal, chemical bottles, high density plastic, and other materials in 2011. In 2011, IBM plans to continue to improve the efficiency of the decontamination processes and evaluate additional waste streams for addition to the decontamination processes.

PLATINUM OFF-SITE RECLAIM FEASIBILITY STUDY

Platinum is removed from the wafer surface during an etching process on a single manufacturing tool and sent to the IWTP in the form of rinse water.

In 2010, a feasibility study for on-site platinum reclaim was completed. The study conducted showed that the aqua regia mixture was incompatible with the platinum recovery unit's material of construction. On-site reclaim is not a technically feasible at this time. The next step in this process is to investigate the feasibility of sending this material off site for reclaim.

INVESTIGATE HIGH WATER CONTENT IN GENERAL SOLVENT 1 AND 2 WASTE STREAM

The Plan-Do-Check-Act (PDCA) problem solving methodology will be utilized in 2011 to determine the main sources of intermittent high water content in the General Solvent 1 and 2 waste stream. Once the sources are identified, corrective actions will be established and reviewed for economic and technical feasibility.

EVALUATE USE OF NEW AIR ABATEMENT TECHNOLOGY TO REDUCE RESIN SCRUBBER CANISTER WASTE GENERATION

Conduct a technical analysis to determine whether the waste generation rate of resin based scrubber canisters can be reduced by the addition of a new IBM designed water based air abatement technology on certain semiconductor manufacturing tools.